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The Orbit of 36 *Andromedæ* (Σ 73). By T. Lewis.

		h	m	s	
R.A.	... ...	0	50	4	1890·0
		°	′	″	
N.P.D.	... ...	66	58	3	

Some time ago, having drawn the apparent ellipse for this binary, I was surprised to find that the companion had passed ap-astron. According to Doberck's elements, computed in 1875, this should not occur till 1973. Collecting all the published observations, I carefully plotted them on millimètre paper, and found that a satisfactory curve could not be drawn through them. By comparing neighbouring observations, a systematic difference between the observers was very apparent. The final personal equations deduced were:—

	°		″		°		″
H_2.	−0·5	and	·00	Ta.	+1·5	and	+0·3
Σ.	−0·5	„	·00	Har.	−0·5	„	−·05
Sm.	−0·5	„	−·02	Gld.	+0·6	„	+·05
Md.	−1·4	„	−·02	Dob.	−0·3		...
Da.	+1·2	„	+·05	Sch.	−0·3		...
OΣ.	0·0	„	−·05	W. & S.	−0·5	„	+·04
De.	+0·7	„	+·05	Hall.	−0·5		...
Sec.	−0·3	„	+·10	Eng.	+0·2	„	−·05

The quantities are applicable to the observations with the given sign. For other observers an equation either could not be deduced or the material was insufficient. After correcting the position-angles for precession to 1890, and also for the P.E.'s, they were again plotted and a curve drawn, from which an ellipse was computed according to the method of Herschel. These elements were then corrected by Klinkerfues' method and the definitive elements obtained.

P	137·5 years	☊	123° 33′ (1890·0)
T	1819·7	λ	70° 0′
ε	0·67	α	1″·09
γ	44° 30′	μ	2°·62

Doberck's period is 349 years.

Below is a comparison between the observations as corrected for P.E. and precession, and those computed from the above elements.

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Epoch.	O	C	O−C	O	C	O−C	Observer.
	°	°	°	"	"	"	
1830·67	302·0	302·8	−0·8	0·72	0·81	−·09	H_2.
30·78	306·8	3·1	+3·7	·90	·81	+·09	H_2.
31·79	308·3	5·5	+2·8	·78	·83	−·06	H_2.
32·14	307·5	307·0	+0·5	0·85	·84	+·01	Σ.
35·92	315·4	313·7	+1·7	1·08	·93	+·15	Sm.
36·98	318·8	315·8	+3·0	0·94	0·96	−·02	Σ.
39·77	318·2	320·4	−2·2	1·08	1·04	+·04	Sm.
39·79	319·2	0·4	−1·2	1·14	·04	+·10	Da.
40·35	321·2	1·3	−0·1	1·05	·05	·00	Md.
40·98	320·7	2·1	−1·4	1·13	·07	+·06	Da.
41·59	323·5	2·8	+0·7	1·17	·08	+·09	Md.
41·64	322·2	323·1	−0·9	1·15	1·09	+·06	OΣ.
41·87	322·6	323·4	−0·8	1·13	1·10	+·03	Da.
42·34	323·6	3·8	−0·2	0·99	1·11	−·12	Ka.
42·77	324·5	4·3	+0·2	1·03	1·12	−·09	Md.
42·94	324·2	4·5	−0·3	1·06	1·12	−·06	Da.
43·12	322·6	4·8	−2·2	0·98	1·14	−·16	Sm.
43·92	324·8	5·8	−1·0	1·17	1·18	−·01	Da.
46·78	329·0	9·0	0·0	1·21	1·19	+·02	OΣ.
46·93	330·2	9·2	+1·0	1·17	1·19	−·02	Da.
46·99	327·8	9·3	−1·5	1·24	1·20	+·04	Md.
47·68	330·4	330·1	+0·3	1·05	1·20	−·15	Mit.
47·89	328·3	0·2	−1·9	1·21	1·21	·00	Md.
47·92	331·1	0·3	+0·8	1·28	1·23	−·05	Da.
50·91	333·3	3·4	−0·1	1·22	1·23	−·01	Da.
51·00	332·2	3·6	−1·4	1·37	1·24	+·13	Md.
51·78	335·1	4·3	+0·8	1·29	1·24	+·05	Md.
51·94	336·6	4·5	+2·1	1·11	1·24	−·13	Flt.
52·60	334·3	5·1	−0·8	1·33	1·25	+·08	Md.
52·69	333·8	5·2	−1·4	1·32	1·25	+·07	OΣ.
52·83	335·4	5·3	+0·1	1·28	1·25	+·03	Sm.
53·09	335·8	5·6	+0·2	1·41	1·26	+·15	Md.
53·89	336·4	6·5	−0·1	1·21	1·26	−·05	Da.
53·96	338·1	6·6	+1·5	1·18	1·27	−·09	J.
54·69	338·3	7·3	+1·0	1·24	1·28	−·04	OΣ.
54·75	337·1	7·4	−0·3	1·28	1·28	·00	Da.
54·91	340·2	7·5	+2·7	1·25	1·28	−·03	Mor.
55·29	335·3	7·7	−2·2	1·35	1·28	+·07	Md.
55·52	335·8	7·9	−2·1	1·30	1·28	+·02	De.

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Epoch.	O	C	O−C	O	C	O−C	Observer.
1855·99	336°·1	338°·4	−2°·3	1″·18	1″·28	−″·10	De.
56·09*	344·3	8·5	+5·8	1·30	1·28	+·02	Win.
56·61	338·0	9·1	−1·1	1·25	1·29	−·04	De.
56·73	338·5	9·2	−0·7	1·32	1·29	+·03	OΣ.
56·97	338·9	9·3	−0·4	1·25	1·29	−·04	De.
57·03	339·2	339·4	−0·2	1·29	1·29	·00	Sec.
57·75	339·1	340·0	−0·9	1·37	1·30	+·07	Md.
57·84	338·3	0·1	−1·8	1·17	1·30	−·13	Sec.
58·04	338·8	0·3	−1·5	1·32	1·31	+·01	Md.
59·36	343·3	1·6	+1·7	1·23	1·32	−·09	Md.
59·83	341·5	2·0	−0·5	1·24	1·32	−·08	Da.
59·89	340·2	2·1	−1·9	1·34	1·33	+·01	Md.
60·83	343·9	2·8	+1·1	1·42	1·33	+·09	Md.
61·74	344·2	3·6	+0·6	1·30	1·34	−·04	OΣ.
61·81	342·3	3·7	−1·4	1·34	1·34	·00	Md.
62·78	344·8	4·3	+0·5	1·17	1·35	−·18	De.
62·83	344·5	4·4	+0·1	1·31	1·35	−·04	Md.
63·83	345·2	5·5	−0·3	1·22	1·35	−·13	De.
64·77	345·8	6·4	−0·6	1·27	1·36	−·09	De.
65·11	348·9	6·6	+2·3	1·57	1·36	+·21	Eng.
65·65	346·6	7·0	−0·4	1·26	1·36	−·10	De.
65·69	344·9	7·1	−2·2	1·35	1·36	−·01	Knott.
65·73	348·6	7·2	+1·4	1·10	1·36	−·26	Ta.
66·05	349·3	7·4	+1·9	1·41	1·36	+·05	Sec.
66·74	349·8	7·9	+1·9	1·46	1·37	+·09	Har.
66·81	347·8	8·0	−0·2	1·17	1·37	−·20	De.
66·83	345·8	8·0	−2·2	1·41	1·37	+·04	Ta.
67·03	351·0	8·2	+2·8	1·25	1·37	−·12	Ka.
67·70	348·5	8·7	−0·2	1·29	1·37	−·08	De.
68·41	349·4	9·3	+0·1	1·17	1·37	−·20	Har.
68·66	350·7	9·5	+1·2	1·44	1·37	+·07	De.
68·76	350·8	349·6	+1·2	1·57	1·37	+·20	Br.
69·66	350·3	350·6	−0·3	1·36	1·38	−·02	De.
69·72	351·1	0·6	+0·5	...	...	...	Ta.
69·86	349·1	0·8	−1·7	1·35	1·38	−·03	Har.
70·14	350·6	0·9	−0·3	1·25	1·38	−·13	Gld.
70·35	350·5	1·0	−0·5	1·27	1·38	−·11	De.
70·60	350·9	1·2	−0·3	1·35	1·38	−·03	Gld.

* A single observation, apparently 5° in error.

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Epoch.	O	C	O–C	O	C	O–C	Observer.
	°	°	°	″	″	″	
1871·60	353·5	352·0	+1·5	1·25	1·38	–·13	Gld.
71·62	353·2	2·0	+1·2	1·47	1·38	+·09	De.
72·03	351·9	2·4	–0·5	1·40	1·39	+·01	W. & S.
72·65	353·3	2·8	+0·5	1·40	1·39	+·01	De.
72·86	349·0	3·0	–4·0	1·27	1·39	–·12	Ta.
72·88	354·1	3·0	+1·1	1·22	1·39	–·17	W. & S.
73·68	353·1	3·8	–0·7	1·41	1·39	+·02	De.
73·81	352·7	3·9	–1·2	1·38	1·39	–·01	W. & S.
73·86	353·2	4·0	–0·8	1·32	1·39	–·07	Ta.
73·91	353·6	4·0	–0·4	1·45	1·39	+·06	Gld.
74·04	355·8	4·1	+1·7	1· ±	1·39	...	Nobile.
74·80	355·2	4·7	+0·5	1·32	1·38	–·06	De.
74·94	355·5	4·8	+0·7	1·45	1·38	+·07	W. & S.
75·54	355·9	5·3	+0·6	1·42	1·38	+·04	W. & S.
75·62	356·5	5·4	+1·1	1·30	1·38	–·08	De.
75·70	356·2	5·5	+0·7	1·42	1·38	+·04	Du.
76·00	358·1	5·8	+2·3	1·34	1·38	–·04	Hall.
76·07	355·4	5·8	–0·4	...	...	...	Gld.
76·08	359·0	5·8	+3·2	...	...	...	Dob.
76·75	354·7	6·4	–1·7	1·16	1·37	–·21	Dob.
76·78	356·7	6·4	+0·3	1·43	1·37	+·06	De.
76·95	358·1	6·5	+1·6	1·32	1·37	–·05	W. & S.
77·02	355·9	6·6	–0·7	1·28	1·37	–·09	Sp.
77·02	355·6	6·6	–1·0	1·28	1·37	–·09	Sch.
77·19	358·2	6·8	+1·4	1·49	1·37	+·12	Pl.
77·52	357·1	7·0	+0·1	1·37	1·37	·00	De.
77·62	356·0	7·0	–1·0	...	1·37	...	Gld.
77·94	358·3	7·4	+0·9	1·37	1·37	·00	W. & S.
78·45	357·8	7·7	+0·1	...	1·36	...	Gld.
78·87	356·4	8·2	–1·6	1·33	1·36	–·03	Hall.
78·90	357·6	8·2	–0·6	1·20	1·36	–·16	Dob.
79·86	360·5	8·8	+1·7	...	1·36	...	Dob.
80·11	359·5	9·1	+0·4	1·38	1·36	+·02	Jed.
80·89	359·8	359·6	+0·2	1·32	1·35	–·03	Dob.
82·01	360·9	360·6	+0·3	1·34	1·34	·00	Schi.
82·10	360·6	0·7	–0·1	1·36	1·34	+·02	Eng.
82·81	361·8	1·5	+0·3	1·32	1·33	–·01	Dob.
83·02	361·2	1·6	–0·4	1·37	1·33	+·04	Eng.
83·16	363·1	1·7	+1·4	1·51	1·33	+·18	Seab.

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Epoch.	O	C	O−C	O	C	O−C	Observer.
	°	°	°	″	″	″	
1883·32	361·2	361·8	−0·6	1·41	1·33	+·08	Eng.
83·86	361·7	1·8	−0·1	1·27	1·32	−·05	Per.
84·12	361·9	2·1	−0·2	1·27	1·31	−·04	Eng.
85·25	364·1	3·1	+1·0	1·35	1·30	+·05	Schi.
85·28	362·0	3·1	−1·1	1·15	1·30	−·15	Per.
87·01	365·2	5·1	+0·1	1·15	1·28	−·13	Schi.
88·05	367·4	6·1	−1·3	1·18	1·27	−·09	Schi.
88·51	366·1	6·6	−0·5	1·21	1·26	−·05	Lev.
1891·08	369·2	368·8	+0·4	1·35	1·25	+·10	Maw.*

Proper Motions of Twenty Southern Stars.

By J. L. E. Dreyer, Ph.D.

In the *Monthly Notices* for May 1886 I discussed the Proper Motions of twenty-nine telescopic stars occurring in the Second Armagh Catalogue of Stars. In the present paper I have put together the positions from all available sources of twenty stars which seem endowed with proper motion, which (with two exceptions) has not been noticed before, at least so far as I am aware.

These stars are all situated in the region covered by the southern *Durchmusterung*, viz. between 2° and 23° south declination. In 1881 the late Professor Schönfeld suggested to me to observe about nine hundred stars, of which the earlier observations differed considerably *inter se* or from the Bonn zones. These stars were accordingly observed with the Dunsink Meridian Circle by myself, and afterwards by Mr. Rambaut, and the resulting places for 1885 were published in part vi. of the *Dunsink Observations*. I have recently examined the more remarkable cases which might arise from proper motion, but only in twenty cases could such be established with certainty, while a number of other cases must be deferred until further observations have been obtained. I have also passed over a number of stars the proper motions of which have been determined elsewhere.

As the materials were rather scanty, and will ere long be considerably improved by the publication of the Paris Catalogue and the southern zone-work of the Astronomische Gesellschaft, I have not applied any of the so-called systematic corrections to

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* The last measure, a mean of three nights, was kindly made for me by Mr. W. H. Maw, for comparison after the orbit was computed. The angle agrees well with that computed.